Assignment 11

Plane Figures; Geometric Construction and Solid Figures; Numerical Trigonometry

Textbook Assignment: Chapters 17 (186-189), 18, 19

11-1. Refer to figure 17-14 in your textbook. In the parallelogram, which of the following is true?
1. Angle DAB equals angle BCD.
2. AD equals BC.
3. DC is parallel to AB.
4. Each of the above is true.

11-2. A rectangle is a parallelogram whose four angles are 90° each.

11-3. Since every square is a rectangle and every rectangle is a parallelogram, it logically follows that every parallelogram is a square.

11-4. The formula for calculating the area of a parallelogram is
1. $A = bh$
2. $A = \frac{1}{2}bh$
3. $A = 2h + 2b$
4. $A = \frac{1}{2}h(b_1 + b_2)$

11-5. Refer to figure 17-15 in your textbook. If the nonparallel sides of a trapezoid are extended until they meet, a triangle is formed.

11-6. In square units, what is the area of a trapezoid whose height is 8 units and whose bases are 10 and 12 units respectively?
1. 88
2. 100
3. 108
4. 176

11-7. Which of the following terms does not apply to a circle?
1. Circumference
2. Diameter
3. Chord
4. Side

11-8. The diameter of a circle is a chord of the circle.

11-9. That part of a circle cut off by two radii is called
1. an arc
2. a sector
3. a portion
4. a segment

11-10. When π is used in calculations, its value is considered to be
1. exactly 3.14
2. exactly the diameter divided by the circumference
3. approximately the radius times the circumference
4. approximately 3.14

11-11. A circle, whose radius is 10 units, has a circumference of
1. 78.5 units
2. 31.4 units
3. 62.8 units
4. 314.0 units

11-12. A circle whose diameter is 10 units has an area of
1. 31.4 square units
2. 78.5 square units
3. 157.0 square units
4. 314.0 square units

11-13. Two concentric circles have radii of 5 in. and 10 in. respectively. The area of the ring between the two circles is
1. 78.5 sq in.
2. 235.5 sq in.
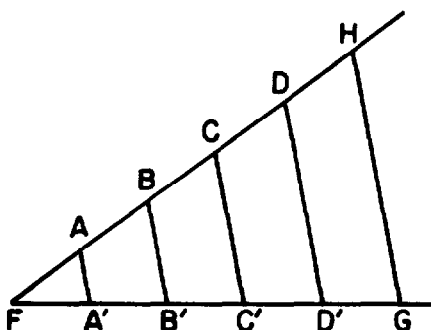3. 225.0 sq in.
4. 942.0 sq in.

Figure 11A.--Dividing line FG into equal segments.

● In answering items 11-14 through 11-16 refer to figure 11A.

11-14. When figure 11A was being constructed, the line segment FH was drawn. When line segment FG, the line to be divided, had been drawn, what was the next step?
1. Points G and H were connected.
2. Lines parallel to HG were drawn.
3. Line FH was marked off into 5 equal segments.
4. Line FG was marked off into 5 equal segments.

11-15. Relative to the figure, which of the statements is correct?
1. FA equals AB equals BC.
2. FA' equals A'B' equals B'C'.
3. HG is parallel to BB'.
4. Each of the above is correct.

11-16. The line segment FH can be longer than the given line segment FG.

11-17. When a line segment is to be bisected by the geometric method, the arcs to be employed must have a radius of what length?
1. Half as long as the line segment
2. Twice as long as the line segment
3. More than half the length of the line segment
4. Less than half the length of the line segment

11-18. The instrument used in mathematical construction to draw circles is called a compass.

● In answering items 11-19 through 11-22, refer to figure 18-4 in your textbook.

11-19. In order to construct a perpendicular to line segment AB at point C, point O was chosen as a convenient point above the line at which to begin the construction.

11-20. Any radius may be chosen to draw the circle whose center is located at point O.

11-21. Line EC is drawn before line ED.

11-22. The angle formed by lines EC and CD is a right angle.

11-23. Refer to figure 18-5 in your textbook and assume that the intersection of the two construction arcs between points A and B is point X. In bisecting the angle AOB, point X is determined by which successive steps?
1. Carefully draw the angle AOX so that it is exactly equal to the angle BOX.
2. First construct the segment OC to equal the segment CX, then construct OD equal to DX.
3. First construct the segment OC to equal the segment OD, then construct CX equal to DX.
4. First construct the segment OC to equal the segment CX, then construct CX to be slightly greater than DX.

11-24. Any triangle whose sides are in the ratio of 3 to 4 to 5 is a right triangle.

11-25. Using a compass and ruler to construct a 60-degree angle, which of the following instructions should you follow?
1. Trisect a straight angle.
2. Draw a 3-4-5 right triangle.
3. Draw an equilateral triangle.
4. Bisect an angle of an equilateral triangle.

11-26. Using a compass and ruler, which of the following operations could you perform?
1. Bisect a right angle.
2. Construct a right triangle containing two equal sides.
3. Bisect a 30-degree angle.
4. You could do each of the above.

11-27. To find the center of a circle, how many perpendicular bisectors of chords of the circle must be drawn?
1. One
2. Two
3. Three
4. Four

11-28. The perpendicular bisector of any chord of a circle passes through the center of the circle.

11-29. Refer to figure 18-9 in your textbook. In constructing the ellipse, the distances ab and ac are equal respectively to
1. AB, DC
2. DC, AB
3. $\frac{1}{2}$AB, $\frac{1}{2}$DC
4. $\frac{1}{2}$DC, $\frac{1}{2}$AB

11-30. A cylinder is one example of a prism.

11-31. Which of the following gives a particular type prism its name?
1. Lateral faces
2. Edges
3. Base
4. Size

11-32. How many faces does a parallelepiped have?
1. 5
2. 6
3. 8
4. Either 6 or 8

11-33. What is the total surface area of a triangular prism eight inches long with each base a right triangle whose sides measure three inches, four inches, and five inches, respectively?
1. 56 sq in.
2. 96 sq in.
3. 102 sq in.
4. 108 sq in.

11-34. Refer to figure 18-11 in your text. A right prism whose dimensions are 3 in. by 4 in. by 1 ft has a volume of how many cu in.?
1. 12 cu in.
2. 19 cu in.
3. 24 cu in.
4. 144 cu in.

11-35. A straight line moving at right angles to its length and such that its lower end traces a closed curve always generates a
1. solid
2. prism
3. cylinder
4. circular cylinder

11-36. What is the volume of a right circular cylinder whose base has a radius of 10 inches and whose height is 21 inches?
1. 1318 cu in.
2. 2198 cu in.
3. 6594 cu in.
4. 8792 cu in.

11-37. What is the lateral area of a pyramid with a 6-sided base measuring 8 inches on a side if the slant height is 25 inches?
1. 600 sq in.
2. 800 sq in.
3. 1200 sq in.
4. 1600 sq in.

11-38. Find the lateral area of a right circular cone whose slant height is 10 inches and whose base has a radius of 8 inches.
1. 160 sq in.
2. 251.2 sq in.
3. 502.4 sq in.
4. 2009.6 sq in.

11-39. How much material is needed to make both the base and lateral surface of a right circular cone whose base has a radius of 5 inches and whose slant height is 8 inches?
1. 135.60 sq in.
2. 175.20 sq in.
3. 178.50 sq in.
4. 204.10 sq in.

11-40. What is the volume of a right circular cone whose height is 9 inches and whose base has a diameter of 2 inches?
1. 9.42 cu in.
2. 28.26 cu in.
3. 37.68 cu in.
4. 56.52 cu in.

11-41. Which of the following solid figures has the greatest volume?
1. Sphere, with a radius of 2 inches
2. Right rectangular prism, with dimensions of 2, 3, and 4 inches
3. Right cylinder, with base radius of 2 inches and height of 2 inches
4. Pyramid, with base a square of 3 inches on a side and height of 7 inches

11-42. The volume of a sphere whose radius is m is given by the formula
1. $4\pi m^2$
2. $\frac{4}{3}\pi m^2$
3. $\frac{4}{3}\pi m^3$
4. $\frac{4}{3}m^3$

11-43. The amount of material required to cover a spherical ball whose radius is 2 inches is
1. 12.56 sq in.
2. 25.12 sq in.
3. 33.49 sq in.
4. 50.24 sq in.

11-44. Which of the following figures has the greatest surface area?
1. Sphere with a radius of 2 inches
2. Right rectangular prism with dimensions of 2, 3, and 4 inches
3. Right cylinder, excluding the bases, with radius of base 3 inches and height of 3 inches
4. Pyramid, excluding the base, with base a square of 3 inches on a side and a slant height of 7 inches

11-45. What is the hypotenuse of a right triangle whose sides are 5 and 12 units?

1. 13   3. 15

2. 14   4. 16

11-46. If the hypotenuse of a right triangle is 8 units and one leg is 4 units, what is the length of the second leg?
1. 4.00
2. 6.73
3. 6.93
4. 8.94

11-47. If two triangles ABC and A'B'C' are similar such that angle A = angle A' and angle B = angle B', which of the following equalities are true?
1. $\frac{AB}{A'B'} = \frac{BC}{B'C'}$; angle C = angle C'.

2. $\frac{AB}{A'B'} = \frac{AC}{A'C'}$; angle A = angle A' = 45°.

3. $\frac{AC}{A'C'} = \frac{BC}{B'C'}$;
AB + BC + AC = A'B' + B'C' + A'C'.

4. All of the above are true.

11-48. Refer to figure 19-4 in your textbook. Assume that angle A is 60 degrees, angle B' is 30 degrees, and both angles C and C' are 90 degrees each. If the length of line AB is 5 units, line AC is 2.5 units, and line A'B' is 10 units, what are the values of line B'C', angle A', and line A'C' respectively?
1. B'C' = 4.33; angle A' = 60°; A'C' = 5.0
2. B'C' = 8.66; angle A' = 30°; A'C' = 5.0
3. B'C' = 8.66; angle A' = 60°; A'C' = 5.0
4. B'C' = 11.2; angle A' = 30°; A'C' = 10.0

11-49. The six trigonometric quantities, sin θ, cos θ, tan θ, cot θ, sec θ and csc θ, represent ratios of the sides of right triangles.

● In answering items 11-50 through 11-54, refer to figure 19-7 (B) in your textbook.

11-50. The secant of angle α equals

1. $\frac{r}{x}$ 3. $\frac{r}{y}$

2. $\frac{x}{r}$ 4. $\frac{y}{r}$

11-51. The tangent of angle θ equals

1. $\frac{x}{r}$ 3. $\frac{x}{y}$

2. $\frac{y}{r}$ 4. $\frac{y}{x}$

11-52. The sine of the angle θ is the same as the cosecant of the angle α.

11-53. The tangent of the angle θ and the cotangent of the angle α are identical.

11-54. The cosine of an acute angle of a right triangle is always the side adjacent to the angle divided by the hypotenuse.

11-55. If a table listing the values of the cotangent, secant, and cosecant of angles y from 0° to 90° is given, a table for values of the cosine of angles y from 0° to 90° can be constructed by computing the reciprocals of
1. sin y
2. cos y
3. sec y
4. cot y

● In answering items 11-56 through 11-64, refer to Appendix II.

11-56. The value of the cotangent of an angle of 83 degrees is
1. 0.1219
2. 0.1228
3. 0.9925
4. 8.1443

● In answering items 11-57 and 11-58, refer to the smaller triangle shown in figure 19-4 of your textbook.

11-57. If angle A is 22 degrees and line AB is 10 units, what is the length of line AC?
1. 3.746
2. 4.040
3. 9.135
4. 9.272

11-58. What is the value of angle A when line
BC = 8.693 units and line AC = 10 units?
1. 41°
2. 45°
3. 51.9°
4. 60.4°

11-59. The sine of an angle of 49 degrees,
48 minutes is
1. 0.6455
2. 0.7536
3. 0.7638
4. 1.1833

11-60. The value of the tangent of an angle of
18 degrees 18 minutes is
1. 0.3288
2. 0.3249
3. 0.3307
4. 0.9494

11-61. Using the method of interpolation, what
is the angle whose sine is 0.1573?
1. 8.5°
2. 9.0°
3. 9°2'
4. 9°3'

11-62. What is the angle whose cosine is
0.4169, rounded to the nearest minute?
1. 65°20'
2. 65°22'
3. 65°23'
4. 65°24'

11-63. Using interpolation, what is the tangent
of 37 degrees, 21 minutes?
1. 0.7618
2. 0.7632
3. 0.7640
4. 0.7646

11-64. Using interpolation, what is the value
of sin 16.58°?
1. 0.2845
2. 0.2849
3. 0.2854
4. 0.2856

11-65. In a 30° -60° -90° triangle, the hypotenuse
is twice the side opposite the 60° angle.

● The legs of a right triangle are defined
to be those two sides of a right triangle
which lie opposite acute angles.

11-66. In a 30° -60° -90° triangle, if the
shorter of the two legs is 8 inches what
is the length of the longer leg?
1. 16 in.
2. 16 $\sqrt{3}$ in.
3. 12 $\sqrt{3}$ in.
4. 8 $\sqrt{3}$ in.

11-67. What is the altitude of an equilateral
triangle whose sides are 10 inches?
1. 5 in.
2. $\sqrt{70}$ in.
3. 5 $\sqrt{3}$ in.
4. 5 $\sqrt{2}$ in.

11-68. What is the length of the sides of a
45°-90° triangle whose hypotenuse is
10 units?
1. 5
2. 5 $\sqrt{2}$
3. $\frac{5\sqrt{2}}{2}$
4. 10 $\sqrt{2}$

11-69. A triangle with sides of 6, 8, and 10
units respectively is a right triangle.

11-70. Which of the following triangles is not
a right triangle?
1. A triangle with sides 2, 2 $\sqrt{3}$, and 4
2. A triangle with sides 3, 3, and 3 $\sqrt{2}$
3. A triangle with sides 4, 6, and 9
4. A triangle with sides 10, 24, and 26

11-71. If the distance from the top of a pole
to a point on the ground 16 feet from
its base is 20 feet, what is the height
of the pole?
1. 12 ft
2. 15 ft
3. 18 ft
4. 24 ft

11-72. The six trigonometric ratios are based
on what type triangle?
1. Acute
2. Obtuse
3. Oblique
4. Right

● In answering items 11-73 through 11-75
refer to the trigonometric functions in Appendix
II.

11-73. Refer to figure 19-18 in your text. If
angle A is 30 degrees and angle C is 40
degrees, what is the length of side AC
if side BC is 18 units in length?
1. 32.18
2. 33.83
3. 34.57
4. 35.46

11-74. Refer to figure 19-19 in your textbook. If angle BAC is 40 degrees and side AC is 80 feet long, what is the length of the side BD of triangle CBD if angle BCD has a value of 60 degrees?
1. 120 ft
2. 125.7 ft
3. 130.2 ft
4. 132.2 ft

11-75. Refer to figure 19-21 (A) in your textbook. When angles A, B, and C are 50, 70, and 60 degrees respectively and side b is 12 units, what is the value of side c?
1. 8.4
2. 10.9
3. 11.1
4. 11.7